

Remarks

Claims 1-3, 5, 7-14 and 18-21 have been replaced by new claims 23-35. As amended, the claims recite that the reactive hot melt adhesive composition is a moisture curable hot melt composition and recite that the urethane diol is the reaction product of a cyclic carbonate and a compound containing an amino group and a further group, which may be an amino group or a hydroxyl group. Support may be found on page 2, line 12 and page 3, line 19-23. Support for the new claims may be found in the claims as previously presented and examined. No new matter has been added. Entry is requested.

Claims 1, 9-14 and 19 are rejected under 35 U.S.C. § 102 (b) as being anticipated by U.S. Patent No. 5,001,210 (Corry).

Corry is cited as disclosing urethane diols and polyisocyanates which react to form polyurethanes. The examiner urges that the compositions of Corry contain the ingredients required for use in the practice of applicants' claimed invention and further urges that the compositions of Corry have NCO groups which are inherently capable of reacting with moisture. The examiner concludes that Corry discloses the claimed ingredient combinations in an anticipating manner.

Applicants disagree.

The claimed invention is directed to moisture-curing urethane adhesives, generally referred to in the art as moisture curable hot melt adhesives. In the practice of applicants' invention, polyurethane prepolymers are obtained by reacting a urethane diol with a polyisocyanate. The urethane diol is obtained by reacting a cyclic carbonate and an amino containing compound.

Being a moisture curable hot melt, a stoichiometric imbalance of NCO to OH groups is required in order for moisture cure to proceed. As discussed in applicants' disclosure, and as argued in applicants' prior response, moisture-curing hot melt adhesives consist primarily of isocyanate-capped polyurethane prepolymers obtained by reacting diols (selected from polyethers, polyesters and polybutadienes) with a polyisocyanate (most commonly methylene bisphenyl diisocyanate (MDI)). The mole ratio of NCO/OH is high, typically 1.5-2.0. Cure is obtained through the diffusion of moisture from the atmosphere or the substrates into the adhesive and subsequent reaction. The reaction of moisture with residual isocyanate forms carbamic acid. This acid is unstable, decomposing into an amine and carbon dioxide. The amine reacts rapidly with isocyanate to form a urea. The final adhesive product is a lightly crosslinked material held together primarily through hydrogen bonding of urea groups, and to a lesser extent by the urethane groups. That excess isocyanate is required in order to be moisture curable is well recognized in the art. See, e.g., *Handbook of Adhesives*, Third Edition, 1990, Irving Skeist, Editor., pp. 8-9 and U.S. Patent No. 7,022,804.

Coury does not disclose moisture curable hot melt adhesives. Rather, discloses the formation of polyurethanes that are particularly well suited for use in biomedical applications, but are not moisture curable. The polyurethanes of Coury are prepared by reacting a di-poly (hydroxylalkyl urethane) - formed by reacting a polyamine and a cyclic carbonate - with a polyisocyanate. Coury fails to disclose a composition that contains an excess of isocyanate groups required for reaction with moisture and is silent as to the moisture curability of the described compositions. As previously noted, there is a 1/1 stoichiometry between the urethane polyol and polyisocyanate in all examples of Coury. The polyurethanes of Coury are not moisture reactive, as would be recognized by the skilled artisan. There is no disclosure in Coury

of the use of urethane diols to make moisture curable reactive hot melt adhesives so as to anticipate the claimed invention. Again, in order to be moisture curable, an excess of isocyanate is required. Moisture curable hot melt adhesives are made from diisocyanates and diols with NCO/OH ratios greater than 1, and usually in the range of about 1.5-2/1. The polyurethanes of Coury are not moisture curable and, as such, Coury fails to anticipate the claimed invention.

Withdrawal of this Section 102 rejection is requested.

Claims 1-3, 5, 7-14 and 18-21 are rejected under 35 U.S.C. § 103 (a) as being obvious over EP 1 378 531 A1 (Kesselmayer) in view of U.S. Patent No. 5,001,210 (Coury).

Kesselmayer is cited by the examiner as disclosing moisture reactive hot melt adhesives comprising polyol, polyisocyanate and acrylic polymer. It is the examiner's position that it would have been obvious to one of ordinary skill in the art to use the urethane diols of Coury in place of the polyol of Kesselmayer in order to obtain the benefits taught by Coury.

Applicants disagree.

Kesselmayer discloses a moisture curable reactive hot melt polymer composition formed by admixing components comprising at least one polyol, at least one polyisocyanate and at least one acrylic polymer having tertiary alkyl amide functionality. Notwithstanding the fact that urethane diols were described in the patent literature as early as 1989 (reference is made to the Coury priority document that issued November 28, 1989 as U.S. Patent 4,883,854), urethane diols were not included in Kesselmayer's listing of useful polyols for use in the preparation of moisture curable hot melt adhesives. There is no disclosure or suggestion that would lead one skilled in the art to substitute the urethane diol of Coury for a polyol of K in the manufacture of a moisture curable hot melt adhesive. Moreover, there is nothing that would suggest that use of urethane diols in the manufacture of moisture curable adhesives would allow formulation of

adhesives that can be applied to the substrate surface of low temperatures, i.e., temperature of 100C or lower, as required in claims 13 and 14. This is unexpected and would not have been obvious from the combined disclosure of Kesselmayr and Coury.

Withdrawal of this Section 103 rejection is requested.

Claims 1-3, 5, 7-8 and 13-21 are rejected under 35 U.S.C. § 102 (b) as being anticipated by U.S. Patent publication 2006/0164486 (Guse et al.).

Guse is cited as disclosing applicants' claimed invention. The examiner interprets the recitation of "polyurethane" in paragraph [0033]'s listing of isocyanate reactive polymers to be polyurethane diols which the examiner urges is the same as applicants' required urethane diols.

Applicants' disagree.

Guse discloses a reactive hot melt adhesive comprising an isocyanate and an isocyanate-reactive polymer. Applicants submit that the use polyurethane as a reactant does not anticipate use of a urethane diol as a reactant, as claimed by applicant. The urethane diols required for use in the practice of applicants' invention are prepared by reacting a cyclic carbonate and an amino compound. The resulting molecules would not be polymeric. Thus, even assuming that the polymers of Guse are polyurethane diols, they would be polymeric components which urethane diols prepared as required for use in the claimed invention are not.

Use of urethane diols required for use in the practice of applicants' invention which are required to be prepared by reacting a cyclic carbonate and an amino compound is clearly not a polyurethane as this term is used in the disclose of Guse.

Withdrawal of this Section 102 rejection is requested.

Claims 1-3, 5, 7-14 and 18-21 are rejected under 35 U.S.C. § 103 (a) as being obvious over U.S. Patent publication 2006/0164486 (Guse et al.) in view of U.S. Patent No. 5,001,210 (Coury).

It is the examiner's position that it would have been obvious to one of ordinary skill in the art to use the urethane diols of Coury in place of the polyol of Guse in order to obtain the benefits taught by Coury.

Applicants disagree.

Guse not only fails to teach the use of urethane diols in the formulation of a moisture curable reactive hot melt, but fails to even suggest such a use. Applicants submit that the examiner's rejection is based on the impermissible use of hindsight. Only with knowledge of applicants' disclosure could the examiner even argue that the polyurethane described in paragraph [0033] of Guse could be urethane diol. The suggestion to use a urethane diol of the type that would result by reacting a cyclic carbonate and an amino group containing compound would not be obvious to the skilled artisan and is not suggested by the combined disclosures of the Guse and Coury patent references.

Withdrawal of this Section 103 rejection is requested.

Favorable and early action is requested.

Respectfully submitted,

/Cynthia L. Foulke/

Cynthia L. Foulke
Reg. No. 32,364

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National Starch and Chemical Company
P. O. Box 6500
Bridgewater, New Jersey 08807-0500
Telephone No.: 908-685-7483